

CLAIMS

1. A water absorbent comprising water-absorbing resin particles, which are surface cross-linked and prepared from a water-absorbing resin having a cross-linked structure prepared by polymerizing a monomer including at least acrylic acid and/or its salt, the water absorbent satisfying:

(a) 90% by weight or more of the particles have a diameter less than 850 μm but not less than 150 μm ;

(b) a logarithmic standard deviation ($\sigma \zeta$) of the particle size distribution is in a range of 0.25 to 0.45;

(c) AAPs for 0.9wt% saline is 20g/g or more;

(d) CRCs for 0.9wt% saline is not less than 29g/g but less than 39g/g;

(e) a chemical cross-linking index is 160 or more, the chemical cross-linking index represented by Formula (1):

Chemical Cross-Linking Index

$$= (\text{CRCs}) / (\text{CRCdw}) \times 1000 \cdots (1),$$

where CRCs(g/g) is an absorbency for 0.9wt% saline, and CRCdw(g/g) is an absorbency for deionized water.

25 2. The water-absorbent as set forth in Claim 1 wherein the chemical cross-linking index is 170 or more.

3. A water absorbent comprising water-absorbing resin particles, which are surface cross-linked and prepared from a water-absorbing resin having a cross-linked structure prepared by polymerizing a monomer including at least acrylic acid and/or its salt, the water absorbent satisfying:

(a) 90% by weight or more of the particles have a diameter less than 850 μm but not less than 150 μm ;

10 (b) a logarithmic standard deviation ($\sigma \zeta$) of the particle size distribution is in a range of 0.25 to 0.45;

(c) AAPs for 0.9wt% saline is 20g/g or more;

(f) CRCs for 0.9wt% saline is not less than 15g/g but less than 29g/g;

15 (g) a chemical cross-linking index against pressure is 100 or more, the chemical cross-linking index against pressure represented by Formula (2):

Chemical Cross-Linking Index Against Pressure

20 $= (\text{CRCs}) + (\text{AAPdw}) \cdots (2),$

where CRCs(g/g) is an absorbency for 0.9wt% saline, and AAPdw (g/g) is an absorbency against pressure for deionized water.

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wherein the chemical cross-linking index against pressure is 115 or more.

5. The water absorbent as set forth in any one of
5 Claims 1 to 4, containing a phosphorus atom.

6. The water absorbent as set forth in any one of
Claims 1 to 5, wherein the water absorbent has Saline
Flow Conductivity (SFC) in a range of 30 to 3000
10 ($10^{-7} \cdot \text{cm}^3 \cdot \text{s} \cdot \text{g}^{-1}$) or more.

7. The water absorbent as set forth in any one of
Claims 1 to 6, wherein the water absorbent has Saline
Flow Conductivity (SFC) in a range of 100 to 250
15 ($10^{-7} \cdot \text{cm}^3 \cdot \text{s} \cdot \text{g}^{-1}$) or more.

8. The water absorbent as set forth in any one of
Claims 1 to 7, comprising a liquid permeability improver
20 (F).

9. The water absorbent as set forth in Claim 8,
wherein the liquid permeability improver (F) is a
multivalent metal compound.

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10. A method of producing a water absorbent

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containing water-absorbing resin particles, which are surface cross-linked and prepared from a water-absorbing resin prepared by cross-linking polymerization of a monomer including acrylic acid 5 and/or its salt, wherein:

the water absorbing resin has Swelling Pressure of Gel Layer (SPGL (B)) of 35.0 (kdyne/cm²) or more;

the particles has such a particle size distribution that 95% to 100% by weight of the particles have a 10 diameter less than 850μm but not less than 106μm, the particle size distribution measured by JIS standard sieve; and

a logarithmic standard deviation ($\sigma \zeta$) of the particle size distribution is in a range of 0.25 to 0.45..

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11. A method of producing a water absorbent containing water-absorbing resin particles, which are surface cross-linked and prepared from a water-absorbing resin prepared by cross-linking 20 polymerization of a monomer including acrylic acid and/or its salt, wherein:

the cross-linking polymerization is a boiling polymerization that is carried out in the presence of a water-soluble chain transfer agent of 0.001mol% to 25 10mol% with respect to the monomer to be polymerized by the boiling polymerization.

12. The method as set forth in Claim 10 or 11,
wherein:

the water-absorbing resin has CRCs in a range of 28
5 to 40 (g/g), and Swelling Pressure of Gel Layer (SPGL
(B)) of 40.0 (kdyne/cm²) or more.

13. The method as set forth in any one of Claims 10
to 12, wherein:

10 the water-absorbing resin is surface cross-linked
until the water-absorbing resin has Saline Flow
Conductivity (SFC) of 40 (10^{-7} cm³s g⁻¹) or more, and
then adding a liquid permeability improver to the
water-absorbing resin.

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14.. The method as set forth in any one of Claims 11
to 13, wherein:

20 the particles has such a particle size distribution
that 95% to 100% by weight of the particles have a
diameter less than 850µm but not less than 106µm, the
particle size distribution measured by JIS standard
sieve; and

a logarithmic standard deviation ($\sigma \zeta$) of the
particle size distribution is in a range of 0.25 to 0.45.

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15. The method as set forth in any one of Claims 10,

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12 and 14, wherein:

the monomer contains a water-soluble chain transfer agent by 0.001mol% to 10mol% with respect to the monomer to be polymerized.

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16. The method as set forth in any one of Claims 10 to 15, comprising:

further adding a liquid permeability improver of 0.001 parts to 5 parts by weight with respect to 100 parts by weight of the particles.

17. The method as set forth in any one of Claims 10 to 16, wherein:

every one percent by weight of the liquid permeability improver to the surface cross-linked water-absorbing resin particles, increases Saline Flow Conductivity (SFC) at a rate of 3.5 times or more.

18. The method as set forth in any one of Claims 13, 20 16, and 17, wherein:

the liquid permeability improver contains at least one of an inorganic powder or a multivalent metal compound.

25 19. A water absorbent prepared by the method as set forth in Claims 10 to 18, comprising:

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surface cross-linked water-absorbing resin particles
a chemical cross-linking index against pressure of
the water absorbent being 100 or more, the chemical
cross-linking index against pressure represented by

5 Formula (2):

Chemical Cross-Linking Index Against Pressure

$$= (\text{CRCs}) + (\text{AAPdw}) \cdots (2),$$

10 where CRCs(g/g) is an absorbency for 0.9wt% saline, and
AAPdw (g/g) is an absorbency against pressure for
deionized water.